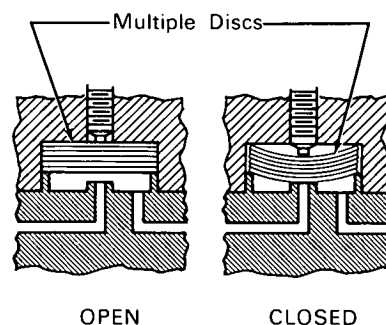
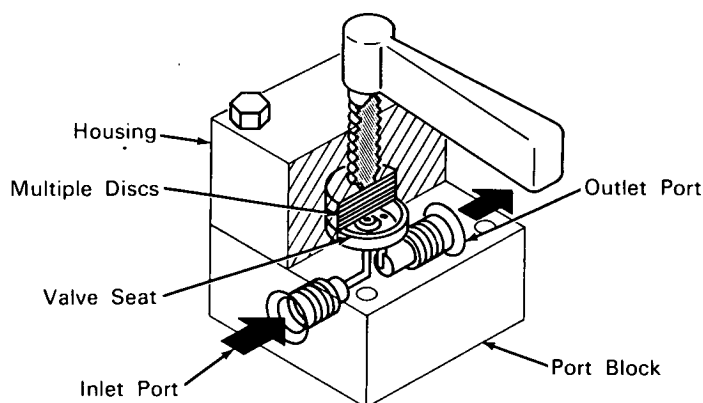


# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## Packless Valve with All-Metal Seal Handles Wide Temperature, Pressure Range



**The problem:** Design of a durable line valve which can operate satisfactorily over a wide temperature and pressure range and which does not require packing or shaft sealing.

**The solution:** A valve utilizing stacked metal disks to seal off an inlet port. No packing or shaft sealing is needed.

**How it's done:** An inlet port is provided in the lower part of the valve body. From the inlet a passage turns upward and enters an enclosed cavity. Entrance is through a boss, or raised portion, approximately centered in the cavity. A circular edge, higher than the boss, forms the perimeter of the cavity.

The valve stem is threaded and goes through to the top of the enclosed cavity. Metal disks, resting on the raised edge of the cavity, can be bent downward by turning the valve handle. Sealing action is obtained by turning the valve stem and forcing the bottom disk against the inlet hole in the boss. Due to the fact that the bottom disk is plated with a soft metal, good seal-

ing characteristics are obtained. An outlet passage with a surface lower than the inlet, permits gases or liquids to go through the valve when the disks are in the open position.

### Notes:

1. Since this valve operates satisfactorily from 1,000°F down through cryogenic temperatures, it could have a number of applications in vacuum or pressure systems which must operate under a wide range of temperature and pressure.
2. Industry applications are limited to systems that can tolerate a high pressure drop, a characteristic of the design. Further development of this valve might improve the pressure drop while retaining the durability of the packless, metal sealing action.

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: William F. MacGlashan  
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